(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau





(43) International Publication Date 23 June 2005 (23.06.2005)

PCT

(10) International Publication Number WO 2005/057493 A1

(51) International Patent Classification⁷: A61B 5/055

G06T 5/40,

(21) International Application Number:

PCT/SG2004/000403

- (22) International Filing Date: 9 December 2004 (09.12.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

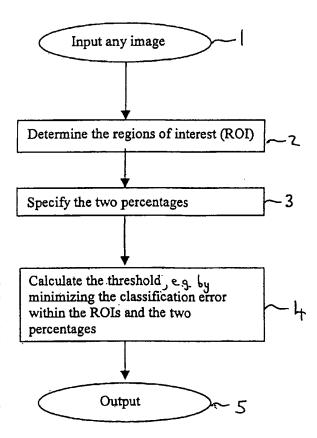
- (30) Priority Data: 200307531-4 10 December 2003 (10.12.2003)
- (71) Applicant (for all designated States except US): AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH [SG/SG]; 20 Biopolis Way, #07-01 Centros, Singapore 138668 (SG).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): HU, Qingmao

[CN/SG]; 3 Jalan Rajawali #06-03, Singapore 598436 (SG). HOU, Zujun [CN/SG]; 30 Biopolis, St #07-01 Matrix, Singapore 138671 (SG). NOWINSKI, Wieslaw, Lucjan [PL/SG]; 111 Clementi Road, NUS Kent Vale, Block C #10-06, Singapore 129792 (SG).

- (74) Agent: WATKIN, Timothy, Lawrence, Harvey; Lloyd Wise, Tanjong Pagar, P.O. Box 636, Singapore 910816 (SG).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR BINARISING IMAGES



(57) Abstract: A method is proposed for binarising an image by deriving an intensity threshold and classifying pixels according to whether their intensity is below or above the threshold. In the derivation of the threshold, prior konwledge is used to define a region of interest (ROI) in the image. Furthermore, prior knowledge is used to select a range in the frequency distribution of the intensities of the pixels in the ROI, and that only data within this frequency range is used to derive the threshold. These techniques provide a highly effective mechanism for incorporating prior knowledge into the threshold selection which is critical whether the image is a medical image or not. In particular, a threshold can be found to binarise images which exhibits high robustness to imaging artefacts such a gray level inhomogeneity and noise.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

of inventorship (Rule 4.17(iv)) for US only

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.